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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/629,489

Filing Date: July 28, 2003

Appellant(s): BULIAN ET AL.

Samuel L. Borkowsky  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 3/26/07 appealing from the Office action  
mailed 10/30/06.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

No amendment after final has been filed.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

|              |         |        |
|--------------|---------|--------|
| 2002/0005145 | Sherman | 1-2002 |
| 2,993,755    | Redanz  | 7-1961 |
| 3,902,917    | Baresel | 9-1975 |
| 3,452,106    | Sato    | 6-1969 |

### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

#### ***Claim Rejections - 35 USC § 102/103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 10 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sherman (U.S. 2002/0005145).

Sherman teaches photocatalyst particles having a size of 1 to 100 nanometers made of tungsten oxide having platelet morphology (paragraph 0206, lines 4-5; paragraph 0208, lines 1-3; paragraph 0209, lines 10-13).

If Sherman does not inherently teach nanosized particles of tungsten oxide having platelet morphology, one of ordinary skill in the art would recognize that it would be obvious to produce nanosized particles of tungsten trioxide having a platelet morphology based on the desired properties of the end product and that the limited number of combinations from the lists (compounds and geometries) would point one of ordinary skill to the combination of tungsten trioxide having a platelet morphology.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-6 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Redanz (U.S. 2993755) in view of Baresel et al. (U.S. 3902917).

Redanz teach a process for making tungstic acid (col. 2, lines 54-56) wherein ammonium paratungstate is mixed with chemically pure hydrochloric acid (col. 2, lines

46-52) and then decanted with water in order to form a precipitate of tungstic acid (tungstic acid is hydrated tungsten trioxide, col. 2, lines 53-56). Redanz fails to teach wherein the hydrochloric acid comprises an aqueous solution of about 35-38 weight percent of hydrochloric acid and wherein a method for preparing anhydrous  $WO_3$  nanopowder comprising heating a precipitate of  $WO_3 \cdot H_2O$  (hydrated tungsten trioxide) at a temperature of 200°C to 400°C.

Baresel et al. teach a process for making finely divided  $WO_3$  (finely divided inherently teaches nanopowder, col. 4, lines 45-48) wherein ammonium tungstate is mixed with concentrated hydrochloric acid (37% HCl by weight, col. 4, lines 30-33) for the purpose of forming tungstic acid hydrate (col. 4, lines 40-43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time appellant's invention was made to provide wherein ammonium tungstate is mixed with concentrated hydrochloric acid (37% HCl by weight, col. 4, lines 30-33) in Redanz in order to form tungstic acid hydrate (col. 4, lines 40-43) as taught by Baresel et al.

As to the limitation wherein a method for preparing anhydrous  $WO_3$  nanopowder comprising heating a precipitate of  $WO_3 \cdot H_2O$  (hydrated tungsten trioxide) at a temperature of 200°C to 400°C, Baresel et al. teach wherein precipitated tungstic acid is heated at a temperature of 200°C (col. 4, lines 40-44) for the purpose of expelling the water formed by the dehydration of tungstic acid to produce tungsten trioxide (col. 4, lines 42-46).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide wherein precipitated tungstic acid is

heated at a temperature of 200°C (col. 4, lines 40-44) in Redanz in order to expel the water formed by the dehydration of tungstic acid to produce tungsten trioxide (col. 4, lines 42-46).

As to the limitation wherein tungsten trioxide hydrate nanosized particles have a platelet morphology, the combined teachings of Redanz and Baresel et al. teach the limitations of making tungsten trioxide hydrate as claimed such that the tungsten trioxide hydrate nanosized particles having a platelet morphology is inherently taught by the combined teachings of Redanz and Baresel et al.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Redanz (U.S. 2993755) in view of Baresel et al. (U.S. 3902917) and Sato et al. (U.S. 3452106).

Redanz teach a process for making tungstic acid (col. 2, lines 54-56) wherein ammonium paratungstate is mixed with chemically pure hydrochloric acid (col. 2, lines 46-52) and then decanted with water in order to form a precipitate of tungstic acid (tungstic acid is hydrated tungsten trioxide, col. 2, lines 53-56). Redanz fails to teach wherein the hydrochloric acid comprises an aqueous solution of about 35-38 weight percent of hydrochloric acid and wherein a method for preparing anhydrous  $WO_3$  nanopowder comprising heating a precipitate of  $WO_3 \cdot H_2O$  (hydrated tungsten trioxide) at a temperature of 200°C to 400°C and wherein the  $WO_3$  nanopowder is reacted with hydrogen gas to form  $WO_2$ .

Baresel et al. teach a process for making finely divided  $WO_3$  (finely divided inherently teaches nanopowder, col. 4, lines 45-48) wherein ammonium tungstate is

mixed with concentrated hydrochloric acid (37% HCl by weight, col. 4, lines 30-33) for the purpose of forming tungstic acid hydrate (col. 4, lines 40-43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide wherein ammonium tungstate is mixed with concentrated hydrochloric acid (37% HCl by weight, col. 4, lines 30-33) in Redanz in order to form tungstic acid hydrate (col. 4, lines 40-43) as taught by Baresel et al.

As to the limitation wherein a method for preparing anhydrous  $WO_3$  nanopowder comprising heating a precipitate of  $WO_3 \cdot H_2O$  (hydrated tungsten trioxide) at a temperature of 200°C to 400°C, Baresel et al. teach wherein precipitated tungstic acid is heated at a temperature of 200°C (col. 4, lines 40-44) for the purpose of expelling the water formed by the dehydration of tungstic acid to produce tungsten trioxide (col. 4, lines 42-46).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide wherein precipitated tungstic acid is heated at a temperature of 200°C (col. 4, lines 40-44) in Redanz in order to expel the water formed by the dehydration of tungstic acid to produce tungsten trioxide (col. 4, lines 42-46).

As to the limitation wherein tungsten trioxide hydrate nanosized particles have a platelet morphology, the combined teachings of Redanz and Baresel et al. teach the limitations of making tungsten trioxide hydrate as claimed such that the tungsten trioxide hydrate nanosized particles having a platelet morphology is inherently taught by the combined teachings of Redanz and Baresel et al.

As to the limitation wherein the  $WO_3$  nanopowder is reacted with hydrogen gas to form an oxide of lower valency than  $WO_3$ , Sato et al. teach a process for making tungsten dioxide (oxide of lower valency than  $WO_3$  is  $WO_2$ , col. 5, lines 38-40) wherein tungsten trioxide is exposed to hydrogen gas (col. 5, lines 40-42) for the purpose of making an oxide of a lower valency (oxide of a lower valency inherently teaches  $WO_2$ , col. 5, lines 38-43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide tungsten trioxide is exposed to hydrogen gas (col. 5, lines 40-42) in Redanz in order to make an oxide of a lower valency (oxide of a lower valency inherently teaches  $WO_2$ , col. 5, lines 38-43).

#### **(10) Response to Argument**

Appellant argues that Redanz differentiates between slurry and solution in the disclosure and that the Office Action states that slurry and solution are equivalents and for at least three reasons, slurry and solution will be treated as equivalent for the purposes of examination.

However, Redanz discloses "The slurry was agitated in a 4-liter beaker for 2 to 3 hours at 75 to 80 C and then allowed to stand for a 24-hour period to settle and cool. After the resulting solution was decanted..." which indicates that a solution is formed after the components are mixed. The components mixed in Redanz are substantially similar to that of the claimed invention such that the characteristics of the solution obtained must be substantially similar to that of the claimed invention.

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Additionally, the combined prior art teach ammonium paratungstate mixed with 37% HCL, which is substantially similar to that of the claimed invention such that the characteristics of the solution obtained must be substantially similar to that of the claimed invention.

Appellant argues that Redanz forms a slurry of ammonium paratungstate in water, and then combines this slurry with concentrated HCL to form another slurry and that solids do not dissolve. Appellant also argues that Redanz refers to the liquid part of the slurry as a solution and the solid part as a yellow cake of tungstic acid.

However, Redanz discloses "The slurry was agitated in a 4-liter beaker for 2 to 3 hours at 75 to 80 C and then allowed to stand for a 24-hour period to settle and cool. After the resulting solution was decanted..." This disclosure does not indicate that the solution is only part of the "mixture" as argued by appellant. It appears that that Redanz discloses a mixing water, ammonium paratungstate, and concentrated hydrochloric acid and that a solution results from the mixing.

Additionally, it appears that Redanz teaches a substantially similar process of mixing substantially similar components (ammonium paratungstate and hydrochloric acid) as that of the currently claimed invention such that the solution formed by the prior art process is substantially similar as that of the claimed invention.

Appellant agrees that the preparation does include water because concentrated HCL is a solution of a solution of HCL in water, but the mere inclusion of water by way

of using a concentrated HCL solution does not mean that Redanz teaches the claimed invention.

However, it is unclear how the claim language is not open to the disclosure of Redanz, specifically that Redanz teaches a solution of water, ammonium paratungstate, and concentrated hydrochloric acid. It appears that appellant is arguing that Redanz teaches the addition of water in an amount in excess of the claimed invention.

However, the amount of water present in the solution is a limitation not claimed. In response to appellant's argument that the references fail to show certain features of appellant's invention, it is noted that the features upon which appellant relies (i.e., amount of water present in solution) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Appellant argues that neither Redanz nor Baresel teaches or suggests a preparation of the precursor solution, a process for making tungsten oxide monohydrate, or a process for making nanopowder.

However, the combination of Redanz and Baresel teach a substantially similar process, including mixing water, 37% HCL, and ammonium paratungstate to form a precipitate and heating said precipitate at the claimed temperature range, as that of the claimed invention such that the product produced by the prior art process is

substantially similar as that of the instantly claimed invention including that the product is tungsten oxide monohydrate and the product is in the form of a nanopowder.

Appellant argues that Sato does not teach the claimed precursor solution of ammonium paratungstate and hydrochloric acid, of combining the precursor solution with water to form a precipitate.

However, Sato is not relied upon to teach the claimed precursor solution of ammonium paratungstate and hydrochloric acid, of combining the precursor solution with water to form a precipitate. Sato is relied upon to teach wherein tungsten trioxide is exposed to hydrogen gas (col. 5, lines 40-42) for the purpose of making an oxide of a lower valency (oxide of a lower valency inherently teaches  $WO_2$ , col. 5, lines 38-43). In response to appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The limitations of the claimed precursor solution of ammonium paratungstate and hydrochloric acid, of combining the precursor solution with water to form a precipitate are addressed in the arguments above.

Appellant argues that Neither Redanz or Baresel teach or suggest a preparation of tungsten oxide monohydrate but that the Office Action argues that tungsten oxide

monohydrate and tungstic acid as the same material ignoring the different physical properties and different chemical properties of each compound.

However, the claims necessitate that water is combined with a solution of ammonium paratungstate and hydrochloric acid; this is substantially similar to the process of Redanz and Baresel (solution of water, ammonium paratungstate, and 37% hydrochloric acid, col. 2, lines 50-54). Because the process of the prior art is substantially similar to that of the claimed invention, the product made by said prior art process is substantially similar that of the claimed invention. The Office Action is **not** arguing that tungstic acid and tungsten oxide monohydrate are the same material.

Appellant argues that neither Redanz nor Baresel teaches nanoparticles, specifically that Redanz discusses particles of size 1.0 to 5.0 nor Baresel considers powder having 60-mircron sized particles to be finely divided.

The recitation: "finely divided" is not relied upon to teach inherency of nanosized particles of tungsten trioxide. However, appellant admits that finely divided is associated with nanosized particles.

Additionally, the process of the prior art is substantially similar to that of the claimed invention, the product of said process of prior art is substantially similar to that of the product produced by the process of the claimed invention *including* properties of said product of the claimed invention including size and morphology.

Appellant has not shown how the process of the prior art is patentably distinct from that of the instantly claimed invention such that from the teaching of the prior art,

one of ordinary skill would expect a substantially similar product produced by the prior art process (mixing water, 37% HCL, and ammonium paratungstate to form a precipitate and heating said precipitate at the claimed temperature range) as produced by the process of the instantly claimed invention.

Appellant argues claims 9 and 10 that are rejected under Redanz in view of Baresel do not teach or suggest a preparation of tungsten oxide monohydrate nanoparticles having platelet morphology (claim 9) and tungsten oxide particles having platelet morphology (claim 10).

However, the combination of Redanz and Baresel teach a substantially similar process, including mixing water, 37% HCL, and ammonium paratungstate to form a precipitate and heating said precipitate at the claimed temperature range, as that of the claimed invention such that the product produced by the prior art process should be substantially similar as that of the instantly claimed invention including that the product is tungsten oxide monohydrate and the product is in the form of a nanopowder.

Additionally, the process of the prior art is substantially similar to that of the claimed invention, the product of said process of prior art is substantially similar to that of the product produced by the process of the claimed invention *including* properties of said product of the claimed invention including size and morphology.

Appellant argues the disclosure in Sherman does not teach render obvious particles of tungsten oxide having platelet morphology. Appellant also argues that the

list of photocatalytic particles is only partially reflected in paragraph [0208] and many more additional compounds are listed in [0207].

However, the list in [0207] refers to metals and/or compounds included in the photocatalyst and/or on the surface of the photocatalyst. This list in paragraph [0208] is a preferred list of photocatalyst particles.

Additionally, appellant argues that Sherman does not associate tungsten oxide with platelets.

However, the disclosure in Sherman states that the photocatalyst particles can be spherical, equiaxial, rod-like, or platelet [209]. Tungsten oxide is listed as a photocatalyst particle [0208]. Therefore, it would have been obvious to one of ordinary skill in the art to provide tungsten oxide particles having morphology of platelets.

Appellant argues that it is not typical for either an anhydrous material or the chemically hydrated material to have the same morphology and that only by obtaining images of the particles at high magnification could one skilled in the art determine the morphology.

However, the rejection over Sherman does not require that either an anhydrous material or the chemically hydrated material to have the same morphology. Claim 10 is obvious over the disclosure of Sherman as described above. Claim 10 is not drawn to an anhydrous material or the chemically hydrated material having the same morphology. In response to appellant's argument that the references fail to show

certain features of appellant's invention, it is noted that the features upon which appellant relies (i.e., anhydrous material or the chemically hydrated material having the same morphology) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Additionally, the rejection does not rely upon obtaining images of the particles at high magnification to determine the morphology. The disclosure of Sherman states that the photocatalyst particles can be spherical, equiaxial, rod-like, or platelet [209]. Tungsten oxide is listed as a photocatalyst particle [0208]. Therefore, it would have been obvious to one of ordinary skill in the art to provide tungsten oxide particles having morphology of platelets.

In conclusion, appellant has argued that Redanz distinguishes between slurries and solutions and that Redanz fails to teach a solution of ammonium paratungstate and hydrochloric acid.

However, it appears that Redanz discloses a solution comprising ammonium paratungstate and concentrated hydrochloric acid. If this does not meet the claimed limitation, the combined prior art (Redanz and Baresel) teach ammonium paratungstate mixed with 37% HCL, which is substantially similar to that of the claimed invention such that the characteristics of the solution obtained must be substantially similar to that of the claimed invention.

Appellant also argues that Sato does not teach the claimed precursor solution of ammonium paratungstate and hydrochloric acid, of combining the precursor solution with water to form a precipitate.

However, Sato is not relied upon to teach the claimed precursor solution of ammonium paratungstate and hydrochloric acid.

Appellant argues that Neither Redanz or Baresel teach or suggest a preparation of tungsten oxide monohydrate but that the Office Action argues that tungsten oxide monohydrate and tungstic acid as the same material.

However, because the process of the prior art is substantially similar to that of the claimed invention, the product made by said prior art process is substantially similar that of the claimed invention. The Office Action is **not** arguing that tungstic acid and tungsten oxide monohydrate are the same material.

Appellant argues that neither Redanz nor Baresel teaches nanoparticles.

However, the process of the prior art is substantially similar to that of the claimed invention, the product of said process of prior art is substantially similar to that of the product produced by the process of the claimed invention *including* properties of said product of the claimed invention including size and morphology.

Appellant argues that Redanz in view of Baresel do not teach or suggest a preparation of tungsten oxide monohydrate nanoparticles having platelet morphology (claim 9) and tungsten oxide particles having platelet morphology (claim 10).

However, the combination of Redanz and Baresel teach a substantially similar process as that of the claimed invention such that the product produced by the prior art process should be substantially similar as that of the instantly claimed invention including that the product is tungsten oxide monohydrate and the product is in the form of a nanopowder.

Appellant argues the disclosure in Sherman does not teach render obvious particles of tungsten oxide having platelet morphology.

However, the disclosure in Sherman states that the photocatalyst particles can be spherical, equiaxial, rod-like, or platelet [209]. Tungsten oxide is listed as a photocatalyst particle [0208]. Therefore, it would have been obvious to one of ordinary skill in the art to provide tungsten oxide particles having morphology of platelets.

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

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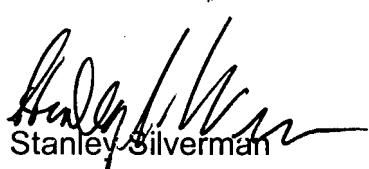
For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Paul Wartalowicz



Conferees:

  
Stanley Silverman  
Kathryn Gorgos